ID de Contribution: **19** Type: **Non spécifié**

N-body problem and potentials : toward a relativistic dynamics

mercredi 20 octobre 2010 15:30 (30 minutes)

In the framework of the nuclear simulations, there are two well-known problems. The first is the N-body problem. In this case, we have to express some potential forces, and use some symplectic integrators to predict the trajectories conserving energy.
The second one is more difficult to avoid. This is the No-Interaction Theorem (NIT) which explain why it is impossible to define a relativistic interaction. I will present a method to avoid this theorem. Then I will discuss the consequences of such a dynamics for the N-body problem in the general case.

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